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(4) The magnitude of the separation is not dependent solely upon the separation observed in the laboratory at unit field-strength, but also varies with the size of the spot and the level in the spot represented by the line in question. Thus high level lines, like H_2 and K_2, show very small displacements, while many lines corresponding to low levels, where the field-strength is much more intense, are widely separated.

(5) The polarization phenomena agree in general with those observed in the laboratory at similar angles with the lines of force, but there are certain notable exceptions that deserve careful study. One of these is illustrated by the behavior of the *p* (central) component of triplets like λ 6173, which may be seen on the map to show small displacements. These would seem to indicate that this line, instead of being single and plane polarized, as observed in the laboratory, consists in the spot of two components, each elliptically polarized in the sense opposite to that of the corresponding *n*-component.

(6) The intensities of the spot lines, which in many cases differ widely from their intensities in the solar spectrum, can be largely accounted for by the combined effects of level, magnetic field, and reduced temperature.

The interpretation of the spot spectrum is being worked out with the aid of laboratory experiments, and special provision has been made for the investigation of lines showing exceptional polarization phenomena.

George E. Hale,
Ferdinand Ellerman.

The Spectrum of Nova Cygni No. 3

The announcement of the discovery of *Nova Cygni No. 3* reached the Lick Observatory on August 23rd. Observations of its spectrum were made on that night and have been continued at intervals of a few days to the present time.

The star was at its brightest on the evenings of the 23rd and 24th, when its magnitude was estimated at 2¼. The observers of Harvard College Observatory place the time of maximum more precisely on August 23rd, and its brightness as 1.9. After August 24th it fell away rapidly in intensity and is now of about the 6th magnitude and accordingly shines with but one-fortieth of its former brilliancy. The first spectroscopic observations were therefore made at about the epoch of maximum and have covered the first part of the waning of the star's light.

On August 23rd the spectrum was marked by dark bands due to hydrogen, calcium and the lines of the enhanced spectrum of iron, displaced, as is usual in the spectra of objects of this kind, toward the violet from their normal positions. "Undisplaced" fine lines of calcium and sodium were also present. In the part of the spectrum more refrangible than the green there was at that time little evidence of emission bands, but in the lower spectrum faint and rather narrow emission bands bordering the red edges of the dark bands were fairly conspicuous. The development of the spectrum has been marked by the formation and increase in intensity of the usual nova emission bands, by a general narrowing of the enhanced metallic dark lines, and by an increase in the displacement of the dark bands. This displacement, which on August 23rd was about −7A, increased as indicated in the following table to between two and three times that amount on August 31st. In this respect the behavior of the star reverses that of *Nova Geminorum* No. 2, which showed a progressive *decrease* in the displacement of the dark bands.

	DISPLACEMENT IN ANGSTROMS			
DATE	H_β	H_γ	H_δ	K
1920 Aug. 23	− 7.8	− 7.0	− 7.0	−6.8
1920 Aug. 24	−11.1	−10.3	− 9.1	−8.0
1920 Aug. 31	−22.	−16.	−22	.....
1920 Sept. 5	−23.	−14	......	.....

The measures for the first two dates are reliable, but the others are to be regarded only as provisional, because the lines in question are involved with other details of the spectrum. The dark hydrogen lines are now multiple and the displacement of the dark metallic lines corresponds approximately with that component of the hydrogen doublet which is least displaced. It seems doubtful whether the agreement is exact, but a definite statement in this regard can not be made in advance of a more complete examination of the plates.[1] The hydrogen emission bands show well defined minima corresponding more or less closely with the normal positions of the lines.

Displacements of the fine sodium and calcium lines. Fine lines at H, K, and D are recorded on all plates of suitable exposure. The D lines were photographed on one occasion with a dispersion of three prisms. They are very strong and, tho of substantial breadth, are sharply defined and exhibit the displacements set forth in the first line of the table. The corresponding quantities for the H and K calcium lines follow them.

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[1] FOOTNOTE.—See the following note.

DATE	D_1	D_2	H	K	MEAN	RAD. VEL.
1920 Aug. 24	−.29A	−.26A	......	......	−.275A	−14.0 km.
1920 Aug. 23	......	......	−.17A	− 21A	....	....
1920 Aug. 24	......	......	−.17A	−.16	....	....
1920 Aug. 31	......	......	(−.56)	−.16	....	....
1920 Sept. 5	......	......	−.37	−.28	−.22	−16.7

The measured displacement of H on August 31st has not been used in forming the mean. The mean of the two sets of velocities determined from the calcium and sodium lines—15.3 km. per second corresponds very well with 16.7 km., the component of the solar motion in the direction of the nova.

A striking feature of the spectrum is the extraordinary strength of the radiation of the lower members of the Balmer series, particularly $H\alpha$. The latter band lends a strong orange tinge to the telescopic image of the star. When the spectrum is photographed with a panchromatic plate this band is many times as intense as any other feature of the record. The fall in intensity of the Balmer series with decreasing wave-length is extremely rapid and appears to be uniform. It requires roughly fifty or a hundred times the exposure given to $H\alpha$ to record a comparable impression of $H\delta$.

Speaking generally, the spectrum of the nova has, up to the present, followed what we have come to regard as the normal course of development. W. H. WRIGHT.

Mount Hamilton, September 16, 1920.

FURTHER NOTE ON THE SPECTRUM OF NOVA CYGNI

Recent plates, secured with somewhat greater dispersion, determine more clearly the nature of the multiple hydrogen absorption lines referred to in the preceding note. There are now at least five and probably six absorption bands, displaced by different amounts toward the violet from the normal positions of the hydrogen lines. The displacements are recorded in the following table, based on plates of September 17th and 18th, which give substantially identical displacements. The first column of the table designates the several components by letter. Under each number of the Balmer series considered are given the displacements of the components, their intensities and the quantity $10^4\kappa$ where κ is $\Delta\lambda/\lambda$, that is, the displacement divided by the normal wave-length of the hydrogen line in question. The proportionality of displacement to wave-length, within the limits considered, is very well indicated by the constancy of κ for any particular component.